

CLAIMS

What is claimed is:

1. A spacer for delivering a medication spray into the lungs of a patient comprising:
 - a. a first body having a large diameter distal end and a small diameter proximal end;
 - b. a second body having a large diameter distal end and a small diameter proximal end joined to the distal end of the first conical body;
 - c. a mouthpiece positioned at the proximal end of the first body;
 - d. a spray inlet positioned at the distal end of the second body; and
 - b. the first body further comprising a first internal chamber and the second conical body comprising a second internal chamber, the first and second internal chambers forming a spray conduit having a continuous spray passage from the spray inlet to the mouthpiece.
2. The spacer of claim 1 further comprising a plurality of air inlets passing through the first, the air inlets positioned downstream from the spray inlet near the distal end of the first conical body.
3. The spacer of claim 2, wherein the plurality of air inlets are evenly spaced around the first body.

4. The spacer of claim 2 wherein the first body includes a large diameter distal end surface and wherein the air inlets are positioned in the large diameter distal end surface.

5. The spacer of claim 4 further comprising a one-way valve proximate the mouthpiece, the one-way valve functional to allow the patient to inhale but not exhale through the spray passage in the spacer.

6. The spacer of claim 1 wherein each of the first body and second body have a conical geometry.

7. The spacer of claim 1 wherein each of the first body and second body have an elliptical geometry.

8. The spacer of claim 1 wherein each of the first body and second body have an oblong geometry.

9. A spacer for delivering a medication spray ejected by an inhaler to the lungs of a patient through the patient's mouth, the spacer comprising:

- a. a conduit having a proximal end and a distal end;
- b. a spray inlet attached to the distal end of the conduit, the spray inlet adapted for receiving the medication spray from the inhaler;
- c. a mouthpiece attached to the proximal end of the conduit;
- d. the conduit including at least one interior chamber defining a continuous spray passage from the spray inlet to the mouthpiece; and

e. at least one air inlet passing through the wall of the conduit, the air inlet positioned downstream from the spray inlet.

10. The spacer of claim 9 further comprising a unidirectional valve functionally positioned within the spray passage proximate the mouthpiece.

11. The spacer of claim 10 wherein the unidirectional valve comprises a tri-leaflet valve.

12. The spacer of claim 10, the conduit comprising a first conical section joined end to end with a second conical section.

13. The spacer of claim 12, wherein the first conical section includes a large diameter distal end surface joined to a small diameter proximal end of the second conical section, and wherein the at least one air inlet is positioned in the distal end surface of the first conical section.

14. The spacer of claim 13, further comprising a plurality of air inlets evenly spaced around the distal end surface of the first conical section.

15. A spacer apparatus for transmitting medication to patients, comprising:

a mouthpiece;

a first chamber, the first chamber having a proximal end connected to the mouthpiece;

a second chamber, the second chamber having a proximal end connected to a distal end of the first chamber;

a spray inlet connected to a distal end of the second chamber, the spray inlet adapted to receive a medication spray, and

an internal spray path defined from spray inlet to the mouthpiece, through the first chamber and the second chamber.

16. The apparatus of claim 15, wherein at least a portion of the one of the first or second chambers is collapsible.

17. The apparatus of claim 15, further comprising a plurality of air inlets passing through the apparatus into the first chamber.

18. The apparatus of claim 17, wherein the first chamber and the second chamber are converging chambers, wherein a diameter of the proximal ends of each chamber are smaller than a diameter of the proximal ends of each chamber.

19. The apparatus of claim 17 wherein the plurality of air inlets have an oblong shape

20. The apparatus of claim 17 wherein the plurality of air inlets are circular.

21. A spacer apparatus for distributing medication to patients, comprising:

an air chamber defining an air passage therethrough, the air chamber having an upstream end and a downstream end, wherein a plurality of air inlets are positioned between the upstream end and the downstream end.

22. The spacer apparatus of claim 21 further comprising an adapter proximate the spray inlet, the adapter functional to receive a spray outlet from a medication dispenser.

23. A spacer for facilitating the delivery of a medication spray from a medication spray dispenser to the mouth of a patient, the spacer comprising:

- a. spray inlet means to receive the medication spray;
- b. a mouthpiece;
- c. spacer walls defining at least one internal chamber and further defining a conduit means fluidly connecting the spray inlet to the mouthpiece; and
- d. means to generate spray recirculation zones proximate the conduit means, the recirculation zones functional to inhibit contact between the medication spray and the spacer walls.

24. The spacer of claim 23, the spacer walls defining first and second internal chambers.

25. The spacer of claim 24, the means for generating high-pressure recirculation zones comprising a closed chamber proximal to the spray inlet and at least one air inlet in the first internal chamber downstream of the spray inlet.

26. A method of delivering a medication spray into the lungs of a patient using a spacer, the method comprising:

directing the medication spray into a spray inlet end of the spacer;

using the medication spray and spacer geometry to generate high-pressure recirculation zones inside the spacer; and

using the high-pressure recirculation zones and the external airflow to direct the medication spray away from walls of the spacer and out of a mouthpiece end of the spacer.

27. The method of claim 26 further comprising delivering air into the spacer through air inlets positioned downstream from the spray inlet.